

WHAT IS CLAIMED IS:

1           1. A method for carrying call control information after a call handover from an  
2 Internet Protocol (IP) packet switched network to a circuit switched cellular network  
3 comprising:

4           generating a first message containing call control information, the first message  
5 being of an IP-based protocol;

6           encapsulating the first message into a second message;

7           transferring the second message to a network element, the network element  
8 being part of a circuit switched cellular network;

9           encapsulating, at the network element, the second message into a third  
10 message;

11           transferring the third message to a gateway;

12           extracting, at the gateway, the first message from the third message; and

13           sending the first message to a server in an IP packet switched network,

14           wherein the first message is carried through the circuit switched network  
15 transparently.

1           2. The method according to claim 1, wherein the IP-based protocol is one of a  
2 Session Initiation Protocol (SIP) and a H.323 protocol.

1           3. The method according to claim 1, wherein the circuit switched cellular network  
2 is a Global System for Mobile Communications (GSM) network.

1           4. The method according to claim 3, wherein the second message comprises  
2 a User Information message.

1           5. The method according to claim 3, wherein the third message comprises a  
2 MAP\_PROCESS\_ACCESS\_SIG message.

1           6. The method according to claim 1, wherein the circuit switched cellular network  
2 is an IS-41 network.

1           7. The method according to claim 1, wherein the circuit switched cellular network  
2 is an IS-136 network.

1           8. The method according to claim 1, wherein the generating and first  
2 encapsulating are performed at a user device.

1           9. The method according to claim 8, wherein the user device comprises a mobile  
2 device.

1           10. The method according to claim 9, wherein the user device comprises one  
2 of a mobile phone, a portable computer, and a Personal Digital Assistant (PDA).

1           11. The method according to claim 1, the IP packet switched network comprising  
2 an IP packet switched mobile network.

1           12. The method according to claim 1, the network element comprising a Mobile  
2           Switching Center (MSC).

1           13. A method for carrying call control information after a call handover from an  
2           Internet Protocol (IP) packet switched network to a circuit switched cellular network  
3           comprising:

4           generating, at an IP packet switched network, a first message containing call  
5           control information, the first message being of an IP-based protocol;

6           encapsulating, at a gateway, the first message into a second message;

7           encapsulating, at the gateway, the second message into a third message;

8           transferring the third message to a network element, the network element being  
9           part of a circuit switched cellular network;

10          transferring the second message to a user device;

11          extracting, at the user device, the first message from the second message; and

12          sending the first message to an application at the user device,

13          wherein the first message is carried through the circuit switched network  
14          transparently.

1           14. The method according to claim 13, wherein the IP-based protocol is one of  
2           a Session Initiation Protocol (SIP) and a H.323 protocol.

1           15. The method according to claim 13, wherein the circuit switched cellular  
2 network is a Global System for Mobile Communications (GSM) network.

1           16. The method according to claim 15, wherein the second message comprises  
2 a User Information message.

1           17. The method according to claim 15, wherein the third message comprises a  
2 MAP\_PROCESS\_ACCESS\_SIG message.

1           18. The method according to claim 13, wherein the circuit switched cellular  
2 network is an IS-41 network.

1           19. The method according to claim 13, wherein the circuit switched cellular  
2 network is an IS-136 network.

1           20. The method according to claim 13, wherein the generating is performed at  
2 an IP packet switched network.

1           21. The method according to claim 13, wherein the user device comprises a  
2 mobile device.

1           22. The method according to claim 12, wherein the user device comprises one  
2 of a mobile phone, a portable computer, and a Personal Digital Assistant (PDA).

1           23. The method according to claim 13, the IP packet switched network  
2 comprising an IP packet switched mobile network.

1           24. The method according to claim 13, the network element comprising a Mobile  
2 Switching Center (MSC).

1           25. A system for carrying call control information after a call handover from an  
2 Internet Protocol (IP) packet switched network to a circuit switched cellular network  
3 comprising:

4           an IP packet switched network, the IP packet switched network including a  
5 processing server, the processing server capable of processing IP-based protocol  
6 messages;

7           a network element, the network element being part of a circuit switched cellular  
8 network;

9           a gateway, the gateway operatively connected to the IP packet switched network  
10 and the circuit switched cellular network, the gateway capable of encapsulating an IP-  
11 based protocol message into a payload of a second message, the gateway further  
12 capable of extracting an IP-based protocol message from a payload of another  
13 message;

14           at least one user device, capable of transmitting and receiving to/from the IP  
15 packet switched network and the circuit switched cellular network, the at least one user  
16 device capable of encapsulating an IP-based protocol message into a payload of a

17 second message, the at least one user device further capable of extracting an IP-based  
18 protocol message from a payload of another message,

19 wherein the IP-based protocol message comprises call control information that  
20 is encapsulated, transparently carried through the switched cellular network, and  
21 extracted, the call control information being carried between the IP packet switched  
22 network and the at least one user device.

1 26. The system according claim 25, wherein the user device comprises one of  
2 a mobile phone, a portable computer, and a Personal Digital Assistant (PDA).

2 27. The system according to claim 25, wherein the IP-based protocol comprises  
one of a Session Initiation Protocol (SIP) and a H.323 protocol.

2 28. The system according to claim 25, wherein the circuit switched cellular  
network comprises a Global System for Mobile Communications (GSM) network.

1 29. The system according to claim 25, wherein the circuit switched cellular  
2 network comprises an IS-41 network.

1 30. The system according to claim 25, wherein the circuit switched cellular  
2 network comprises an IS-136 network.

1           31. The system according to claim 25, wherein the IP packet switched network  
2 comprises an IP packet switched mobile network.

1           32. The system according to claim 25, wherein the network element comprises  
2 a Mobile Switching Center (MSC).

1           33. A system for carrying call control information after a call handover from an  
2 Internet Protocol (IP) packet switched network to a circuit switched cellular network  
3 comprising:

4           a first packet switched network;

5           a circuit switched cellular system, the circuit switched cellular system comprising  
6 a circuit switched cellular network and a second packet switched network;

7           at least one user device, the at least one user device operatively connected to  
8 the IP packet switched network and the circuit switched cellular system,

9           wherein call control information is carried in packets between the IP packet  
10 switched network and the at least one user device transparently through the second  
11 packet switched network.

1           34. The system according to claim 33, further comprising a radio access  
2 network, the at least one user device operatively connected to the circuit switched  
3 cellular system via the radio access network.

1           35. The system according to claim 27, further comprising a call processing  
2 server, the call processing server being part of the first packet switched network.

1           36. The system according to claim 35, further comprising a first packet switched  
2 gateway, the first packet switched gateway being part of the first packet switched  
3 network and operatively connected to the call processing server.

1           37. The system according to claim 36, further comprising a serving node, the  
2 serving node being part of the second packet switched network and operatively  
3 connected to the radio access network and the first packet switched gateway, the  
4 serving node capable of carrying the packets between the at least one user device  
5 through the radio access network and the first packet switched gateway.

1           38. The system according to claim 37, further comprising a second packet  
2 switched gateway operatively connected to the serving node and the call processing  
3 server, the second packet switched gateway capable of carrying the packets between  
4 the serving node and the call processing server.

1           39. The system according to claim 36 the first packet switched gateway  
2 comprising a third generation (3G) IP gateway.

1           40. The system according to claim 37, wherein the serving node comprises a  
2 serving GPRS support node (SGSN).



1           41. The system according to claim 38, wherein the second packet switched  
2 gateway comprises a gateway GPRS support node (GGSN).

1           42. The system according to claim 38, wherein the second packet switched  
2 gateway comprises a second generation (2G) IP gateway.

1           43. The system according to claim 33, wherein the second packet switched  
2 network comprises a General Packet Radio Service (GPRS) network.

1           44. An article comprising a storage medium having instructions stored therein,  
2 the instructions when executed causing a computing device to perform at least one of:  
3           generating a first message containing call control information, the first message  
4 being of an IP-based protocol;

5           encapsulating the first message into a second message; and  
6           transferring the second message to a network element, the network element  
7 being part of a circuit switched cellular network; and

8           receiving a second message from a network element, the network element being  
9 part of a circuit switched cellular network, the second message containing a first  
10 message, the first message containing call control information, the first message being  
11 of an IP-based protocol; and

12           extracting the first message from the second message,

13 wherein the first message is carried between a user device and a packet  
14 switched network through the circuit switched cellular network transparently.

1 45. An article comprising a storage medium having instructions stored therein,  
2 the instructions when executed causing a computing device to perform at least one of:  
3 receiving a second message from a network element, the network element being  
4 part of a circuit switched cellular network, the second message containing a first  
5 message, the first message containing call control information, the first message being  
6 of an IP-based protocol;

7 extracting the first message from the second message; and

8 sending the first message to a server in a packet switched network; and

9 receiving a first message from a packet switched network, the first message  
10 containing call control information, the first message being of an IP-based protocol;

11 encapsulating the first message into a second message;

12 encapsulating the second message into a third message; and

13 carrying the third message to a network element, the network element being part  
14 of a circuit switched cellular network,

15 wherein the first message is carried between a user device and a packet  
16 switched network through the circuit switched cellular network transparently.

1 46. A method for carrying call control information after a call handover from a  
2 circuit switched cellular network to an Internet Protocol (IP) packet switched network  
3 comprising:

4 generating a first message containing call control information, the first message  
5 being of a circuit switched protocol;  
6 encapsulating the first message into a second message;  
7 transferring the second message to a server in an IP packet switched network;  
8 transferring the second message to a gateway;  
9 extracting, at the gateway, the first message from the second message; and  
10 sending the first message to a network element, the network element being part  
11 of a circuit switched cellular network;  
12 wherein the first message is carried through the packet switched network  
transparently.

47. A method for carrying call control information after a call handover from an  
Internet Protocol (IP) packet switched network to a circuit switched cellular network  
comprising:

generating, at a network element, a first message containing call control  
5 information, the network element being part of a circuit switched cellular network;  
6 encapsulating, at a gateway, the first message into a second message;  
7 transferring the second message to a server in an IP packet switched network;  
8 transferring the second message to a user device;  
9 extracting, at the user device, the first message from the second message; and  
10 sending the first message to an application at the user device,  
11 wherein the first message is carried through the packet switched network  
12 transparently.